

## Table of Contents

### Refereed Papers:

<b>Database Architecture for Multi-scale GIS</b> Christopher B. Jones	1
<b>Resolution Revisited</b> Ferenc Csillag	15
<b>Generalization Operations and Supporting Structures</b> Kate Beard and William Mackaness	29
<b>Using Spline Functions to Represent Distributed Attributes</b> John R. Herring	46
<b>New Proximity-preserving Orderings for Spatial Data</b> Alan Saalfeld	59
<b>Zenithial Orthotriangular Projection</b> Geoffrey Dutton	77
<b>Detecting Features in Low Resolution Aerial images of City Blocks</b> Bill Sakoda and Joseph G. Hauk	96
<b>Automatic Digitization of Large Scale Maps</b> Andreas Illert	113
<b>Thematic Mapping from Imagery: An Aspect of Automated Map Generalization</b> Minhua Wang, Peng Gong, and Philip J. Howarth	123
<b>Producing Answers to Spatial Questions</b> Gail Langran	133
<b>Qualitative Spatial Reasoning about Cardinal Directions</b> Andrew U. Frank	148
<b>Improving Spatial Analysis in GIS Environments</b> Geoffrey Dutton	168
<b>Characterization of Functions Representing Topographic Surfaces</b> Gert W. Wolf	186

<b>Simulation of the Uncertainty of a Viewshed</b> Peter F. Fisher	205
<b>Dynamic maintenance of Delaunay Triangulations</b> Thomas Kao, David M. Mount, and Alan Saalfeld	219
<b>Adaptive Hierarchical Triangulation</b> Lori Scarlatos and Theo Pavlidis	234
<b>Structuring the Knowledge of Cartographic Symbolization-- An Object-oriented Approach</b> Feibing Zhan	247
<b>Are Displays Maps or Views?</b> Werner Kuhn	261
<b>UGIX: A GIS Independent User Interface Environment</b> J. F. Raper and M. S. Bundock	275
<b>Algebraic Optimization of Combined Overlay Operations</b> Claus Dorenbeck and Max J. Egenhofer	296
<b>Spatial Overlay with Inexact Numerical Data</b> David Pullar	313
<b>A Diagnostic Test for Error in Categorical Maps</b> Nicholas Chrisman and Marcus Lester	330
<b>GéoGraph: A Topological Storage Model for Extensible GIS</b> K. Bennis, B. David, I. Morize-Quilio, J. Thévenin, and Y. Viémond	349
<b>Topological Models for 3D Spatial Information Systems</b> Simon Pigot	368
<b>The Reactive-tree: A Storage Structure for a Seamless, Scaleless Geographic Database</b> Peter van Oosterom	393
<b>Integration of Spatial Objects in a GIS</b> Richard G. Newell, Mark Easterfield, and David G. Theriault	408

**Summaries for Panel Discussions (Unrefereed):**

**Alternative Representations of Geographic Reality**  
Organizers: Stephen Guptill and Scott Morehouse 416

**What's the Big Deal about Global Hierarchical  
Tesselation?**  
Organizer: Geoffrey Dutton 418

**Visualizing the Quality of Spatial Information**  
Organizers: Barbara P. Buttenfield and M. Kate Beard 423

**Refereed Paper (Late Arrival):**

**A General Technique for Creating SIMD Algorithms on Parallel  
Pointer-based Quadrees**  
Thor Bestul 428